CLAIMS

What is claimed is:

1. A method for treating a well penetrating a subterranean formation, comprising introducing into the well a porous particulate material.

2. The method of Claim 1, wherein the porous particulate material is a selectively configured porous particulate material.

3. The method of Claim 1, wherein the porous particulate material is a non-selectively configured porous particulate material.

4. The method of Claim 2, wherein the selectively configured porous particulate material comprises a porous particulate material which has been chemically treated and further wherein the apparent specific gravity of the selectively configured porous particulate material is less than the apparent specific gravity of the porous particulate material.

5. The method of Claim 1, wherein the porous particulate material is a relatively lightweight and/or substantially neutrally buoyant particle.

6. The method of Claim 1, wherein the porous particulate material exhibits crush resistance under conditions as high as 10,000 psi closure stress.

7. The method of Claim 6, wherein the porous particulate material exhibits crush resistance under conditions from about 250 to about 8,000 psi closure stress.

8. The method of Claim 2, wherein the porous particulate material is a suspension of a porous particulate in a carrier fluid.

9. The method of Claim 8, wherein the porous particulate material has a porosity and permeability such that a fluid may be drawn at least partially into the porous matrix by capillary action.

10. The method of Claim 8, wherein the porous particulate material has a porosity and permeability such that a penetrating material may be drawn at least partially into the porous matrix using a vacuum and/or may be forced at least partially into the porous matrix under pressure.

11. The method of Claim 8, wherein the porous particulate material is a selectively configured porous particulate material coated or penetrated with a liquid resin, plastic, cement, sealant, or binder.

12. The method of Claim 2, wherein the porous particulate material is a selectively configured porous particulate material coated or penetrated with a phenol, phenol formaldehyde, melamine formaldehyde, urethane, or epoxy resin.

13. The method of Claim 2, wherein the porous particulate material is a selectively configured porous particulate material penetrated with nylon, polyethylene or polystyrene or a combination thereof.

14. The method of Claim 11, wherein the penetrating material and/or coating layer of the selectively configured porous particulate material is capable of trapping or encapsulating a fluid having a apparent specific gravity less than the apparent specific gravity of the matrix.

15. The method of Claim 14, wherein the fluid is a gas.

16. The method of Claim 8, wherein the coating layer or penetrating material of the selectively configured porous particulate material is a liquid having an apparent

specific gravity less than the apparent specific gravity of the matrix of the porous particulate material.

17. The method of Claim 2, wherein a coating layer or penetrating material of the selectively configured porous particulate material is a curable resin and further wherein the selectively configured porous particulate material comprises a multitude of coated particulates bonded together.

18. A method for treating a well penetrating a subterranean formation, comprising introducing into the well a selectively configured porous particulate material, the selectively configured porous particulate material being a porous particulate material manufactured with a glazing material or treated with a penetrating layer, coating layer or glazing material such that the strength of the selectively configured porous particulate material is greater than the strength of the porous particulate material.

19. A method for treating a well penetrating a subterranean formation, comprising introducing into the well a selectively configured porous particulate material in a non-gelled carrier fluid, the selectively configured porous particulate material being a substantially neutrally buoyant particulate material comprising a composite of a porous particulate material and a non-porous glazing material or a porous particulate material treated with a non-porous penetrating material, coating layer or glazing layer.

20. The method of Claim 19, wherein the non-gelled carrier fluid contains a friction reducer.

21. The method of Claim 19, wherein the apparent specific gravity of the selectively configured porous particulate material is less than the apparent specific gravity of the porous particulate material.

22. The method of Claim 19, wherein the well is horizontal or is a deviated well having an angle with respect to the vertical of between about 0 degrees and about 90 degrees.

23. The method of Claim 22, wherein the well is a deviated well having an angle with respect to the vertical of between about 30 degrees and about 90 degrees.

24. The method of Claim 1, wherein the porous particulate material has a maximum length-based aspect ratio of equal to or less than about 5.

25. The method of Claim 1, wherein the porous particulate material is a ceramic or organic polymeric material.

26. The method of Claim 25, wherein the porous particulate material is a ceramic.

27. The method of Claim 26, wherein the organic polymeric material is a polyolefin.

28. The method of Claim 12, wherein the coating layer or penetrating material is an ethyl carbamate-based resin.

29. The method of Claim 26, wherein the porous particulate material is a selectively configured porous particulate material having an apparent density from about 1.1 g/cm^3 to about 2.6 g/cm^3, a bulk apparent density from about 1.03 g/cm^3 to about 1.4 g/cm^3, and an internal porosity from about 10% to about 75 volume percent.

30. The method of Claim 2, wherein the selectively configured porous particulate material comprises a porous particulate material to which has been applied a coating layer or penetrating material of an epoxy or phenol formaldehyde resin.

31. The method of Claim 2, wherein the size of the selectively configured porous particulate material is between from about 200 mesh to about 8 mesh.

32. The method of Claim 2, wherein a coating layer or penetrating material is present in the selectively configured porous particulate material in an amount of from about 0.5 to about 10% by weight of total weight.

33. The method of Claim 32, wherein the thickness of the coating layer of the selectively configured porous particulate material is from about 1 to about 5 microns.

34. The method of Claim 2, wherein the selectively configured porous particulate material is introduced or pumped into the well as neutrally buoyant particles in a carrier fluid.

35. The method of Claim 34, wherein the carrier fluid is a completion or workover brine.

36. The method of Claim 34, wherein the carrier fluid is salt water, fresh water, a liquid hydrocarbon, or a gas or a mixture thereof.

37. The method of Claim 36, wherein the gas is nitrogen or carbon dioxide.

38. The method of Claim 34, wherein the fluid pumped into the well further comprises a gelling agent, crosslinking agent, gel breaker, surfactant, foaming agent, demulsifier, buffer, clay stabilizer, acid or a mixture thereof.

39. The method of Claim 2, wherein the selectively configured porous particulate material is a proppant/sand control particulate material.

40. The method of Claim 1, wherein the porous particulate material is introduced into the well with a liquefied gas or foamed gas carrier fluid or a mixture thereof.

41. The method of Claim 40, wherein the liquefied gas or foamed gas carrier fluid is a liquid carbon dioxide based system.

42. The method of Claim 40, wherein the liquefied gas or foamed gas carrier fluid is nitrogen.

43. The method of Claim 40, wherein the liquefied gas or foamed gas carrier fluid is a mixture of liquid carbon dioxide and nitrogen.

44. The method of Claim 40, wherein the liquefied gas or foamed gas carrier fluid is a foam of nitrogen in liquid carbon dioxide.

45. A method for treating a well penetrating a subterranean formation, comprising introducing into the well a selectively configured porous particulate material, the selectively configured porous particulate material being a porous particulate material manufactured with a non-porous glazing material or treated with a non-porous penetrating layer, coating layer or glazing material such that either:

(a.) the apparent density or apparent specific gravity of the selectively configured porous particulate material is less than the apparent density or apparent specific gravity of the porous particulate material;

(b.) the permeability of the selectively configured porous particulate material is less than the permeability of the porous particulate material; or

(c.) the porosity of the selectively configured porous particulate material is less than the porosity of the porous particulate material.

46. The method of Claim 45, wherein the selectively configured porous particulate material is a suspension of the porous particulate material and a porous matrix,

and further wherein the suspension, when introduced into the well, forms a fluid-permeable gravel pack in an annular area defined between the exterior of a screen assembly and the interior of the wellbore.

47. The method of Claim 45, wherein the selectively configured porous particulate material is a porous particulate material having a glazed surface.

48. The method of Claim 47, wherein the glazed surface of the porous particulate material enhances the ease of multi-phase fluid flow through a particulate pack.

49. The method of Claim 47, wherein the glazed surface of the porous particulate material enhances the ease of high rate turbulent gas flow through a particulate pack.

50. The method of Claim 5, wherein the porous particulate material is a substantially neutrally buoyant particle and is introduced or pumped into the well as a suspension in a storage fluid wherein the density of the storage fluid and porous particulate material is of near or substantially equal density.